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Termite Control Biotechnology

Essam A. Makky*, Chan Cai Wen, Muna Jalal and Mashitah M. Yusoff

***Abstract*—** Termites are considered as important pests that could cause severe wood damage and economic loses in urban, agriculture and forest of Malaysia. The ability of termites to degrade cellulose depends on association of gut cellulolytic microflora or better known as mutual symbionts. With the idea of disrupting the mutual symbiotic association, better pest control practices can be attained. This study is aimed to isolate cellulolytic bacteria from the gut of termites and carry out antibacterial studies for termite. Confirmation of cellulase activity is done by qualitative and quantitative methods. Impacts of antibiotics and their combinations as well as heavy metals and disinfectants are conducted by using disc diffusion method. Effective antibacterial agents are then subjected for termite treatment to study the effectiveness of the agents as termiticides. 24 cellulolytic bacteria are isolated, purified and screened from the gut of termites. All isolates were identified as Gram-negative with either rod or cocci in shape. For antibacterial studies result, isolates were found to be 100% sensitive to 4 antibiotics (rifampicin, tetracycline, gentamycin and neomycin), 2 heavy metals (cadmium and mercury) and 3 disinfectants (lactic acid, formalin and hydrogen peroxide). 22 out of 36 antibiotic combinations showed synergistic effect, while 15 antibiotic combinations showed antagonistic effect on isolates. The 2 heavy metals and 3 disinfectants that showed 100% effectiveness as well as 22 antibiotic combinations that showed synergistic effect were used for termite control. Among the 27 selected antibacterial agents, 12 of them were found to be effective to kill all the termites within 1 to 6 days. Mercury, lactic acid, formalin and hydrogen peroxide were found to be the most effective termiticides in which all termites were killed within 1 day only. These effective antibacterial agents possess a great potential to be a new application to control the termite pest species in the future.

***Keywords*—** Antibacterial, Cellulase, Termicide, Termites

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